tion with the Science and Art Department has been of an important character. The Birmingham School Board employs about 800 teachers, and it now provides education, by means of training classes, for about 450 (the pupil-teachers and uncertificated assistants). The growth of the science work in this direction will appear from the following table:—

Year	Number of Certificates obtained	Number of First Class Certificates awarded	Gross Grant
1881	24	0	£18
1882	91	18	£108
1883	100	24	£124
1884	173	33	£197

It is very important to elementary school teachers to do well in science, since (by a regulation of the Education Department) those who have passed in science have a certain number of marks added to those which they obtain for other subjects at the Queen's Scholarship and Certificate Examinations, through which all these teachers have subsequently to pass.

Electricity and magnetism has been taught to the pupil-teachers, and physiography to the assistants.

When evening science lectures are given, however, no school-work can be done by the demonstrators in the afternoon of the same day, as the time is taken up with the preparation of the experiments, &c., for the evening lectures.

The Board possesses an excellent optical lantern presented by Messrs. R. and G. Tangye as a token of their appreciation of the science-teaching and with its assistance the science demonstrator gives popular evening science lectures in the various schools, taking subjects such as will be likely to awaken the interest and increase the intelligence of the children, as "Wild Animals in the Zoo," "The Star-lit Sky," "Two Days in London," "A Voyage to the Moon," &c. Occasionally, on fine evenings, the elder children are shown the moon, planets, double-stars, &c., through a three-inch achromatic telescope (refractor). These expositions tend to attract children to school, and to improve the regularity of the attendance.

COST OF THE SYSTEM.—The following rough balance-sheet for the year 1883-84 shows the very small cost at which the work of science-teaching is carried on in Birmingham:—

	£	s.	d.
Receipts.			
Half of Government Grant on specific subjects ...	160	0	0
Grant from Science and Art Department	150	0	0
	£310	0	0
Expenditure.			
Salaries	750	0	0
Interest on cost of buildings and apparatus ...	70	0	0
Renewal of apparatus and cost of materials ...	50	0	0
	£870	0	0

Net cost to the Board ... ... £560 per annum.

As a penny rate yields 6000*l.*, it will be seen that the cost of this system, by which more than 4000 children, distributed over sixty school departments, receive regular and practical science-lessons, amounts to only one-tenth of a penny in the pound, or to 9*l.* 10*s.* per annum for each school department. It must be remembered also that the full benefit of the system has not yet been reaped, and that the grants will certainly continue to increase. Credit has only been taken for one-half of the grant for the specific subjects.

TEXT-BOOKS.—Failing to meet with works exactly suitable for the wants of the children, the science-lessons in mechanics and in domestic economy have been written out in full, and are now published by Messrs. T. Nelson and Sons. Similar works on magnetism and electricity and on chemistry are nearly ready for issue. Each work consists of three small volumes corresponding with the three years' course prescribed by the Code. These books have already been adopted by the School Board for London, the Irish Intermediate Education Board, and other important educational bodies.

SCHOOL MUSEUMS.—For use in object-lessons, and as a constant source of pleasure and instruction, a small collection of typical objects stored in a glass-fronted cupboard ought to be placed in every school. Such cupboards are now being supplied to the Birmingham Board schools, and it has naturally fallen to the lot of the science demonstrator and his staff to assist in the mounting, naming, and classification of the objects with which the cupboards are, at little or no expense to the Board, to be filled.

CONCLUSION.—Since the commencement of this system of practical instruction in science in Birmingham, many eminent men have visited the schools to see it in operation, and they have been unanimous in their approval. In the "Instructions to Inspectors" issued by the Education Department, the system receives official sanction and commendation:—"You will often find that these (specific) subjects are most thoroughly taught when a special teacher is engaged by a group of schools to give instruction in such subjects once or twice a week, his teaching being supplemented in the intervals by the teachers of the school."

The Commissioners for Technical Education visited the Icknield Street Centre a few months ago, heard science-lessons given, and examined fully into the work. In their valuable Report, recently issued, they say:—"We could hardly overstate our appreciation of the value of the plan of giving instruction in natural science by special teachers as carried out in the Board schools of Liverpool and Birmingham, where the employment of a well-qualified science demonstrator insures the sound character of the instruction, whilst the repetition of the lesson by the schoolmaster enables him to improve himself in the methods of science-teaching."

Within the present year the work has been crowned by the opening of a Technical School for Seventh Standard boys, situated in the centre of the town, and fitted with an admirable laboratory (for forty boys), lecture-theatre, workshop (for forty, with three lathes), room for drawing, class-rooms for the ordinary subjects, and a capital dining-hall, &c. The building has been adapted, fitted (at a cost exceeding 2000*l.*), and presented rent-free to the Board by Mr. George Dixon. This school will constitute the last link of the chain of elementary education supported by the town, and who can doubt that in it will be laid the foundation of many a good work, both for the individual and the community.

NOTES

MR. J. J. THOMSON has been elected to fill the post of Cavendish Professor of Experimental Physics in the University of Cambridge in succession to Lord Rayleigh. A numerously signed requisition to Sir Wm. Thomson to become a candidate was declined.

CAMBRIDGE was *en fête* on Monday. Peterhouse, the oldest collegiate institution in the University, was celebrating the six-hundredth anniversary of its foundation. It was stated at the dinner that one-third of the present Fellows were Fellows of the Royal Society.

IT is announced that the International Sanitary Conference, which Signor Mancini proposed some time ago, will meet at Rome in February or March. Later on another Conference, also suggested by Signor Mancini, will meet to consider the possibility of some agreement for the mutual execution by the Signatory Powers of legal judgments.

The monthly weather review of the Signal Service, prepared, as announced for the first time in the August number of *Science*, by Second-Lieut. W. A. Glassford, has come to be a quarto of twenty-eight pages, with five charts. This is a good growth from the four small pages and three charts of the first issue, eleven years ago. Then, the headings were storms, anti-cyclonic areas, temperature, precipitation, peculiar phenomena and facts, rivers, and cautionary signals: now, all these subjects are treated in much greater detail; and among the many additional topics there may be mentioned atmospheric pressure and its range (illustrated by a new style of chart), Atlantic storms and ice, range of temperature, frosts (illustrated by a chart for August 9 and 25), winds, local storms, tornadoes and thunderstorms, sunsets, drought, two and a half pages on the earthquake of August 10, meteors, and notes of State weather services for Alabama, Nebraska, Tennessee, Missouri, Louisiana, Ohio, and Georgia. The storm-tracks for the month are remarkably regular, and, with insignificant exceptions, all lie north of the Great Lakes and St. Lawrence: no tropical cyclones were felt along the sea-coast. Nine tornadoes are reported, and many violent thunderstorms. Some of the results of the special studies of the latter, undertaken by Mr. H. A. Hazen during the past season, take form in a brief summary, from which it appears that the mean distance and direction of the 900 thunderstorms reported in August, from the centre of the broad cyclonic storms in which they occurred, was 515 miles, a little west of south. A full account of these studies will be of much value and interest. Most of the observations on meteors are of small value, and, at best, they have but an etymological connection with a weather-review.

The completion of the Lick Observatory is stated by *Science* now to depend upon the successful making of the disk of glass for the objective of the large telescope. The main dome cannot be made till the focal length of the large equatorial has been determined.

A member of the Institute of France has brought forward a scheme for the foundation of a number of annuities, of the value of 80*l.*, 160*l.*, and 240*l.*, to aid scientific men in the prosecution of experimental work, offering to subscribe 200*l.* towards the realisation of the scheme out of his own pocket. If the Government, who will soon have to decide on the application of Giffard's legacy of over 200,000*l.*, thought fit to patronise this scheme, they have the means of giving it practical embodiment on an extensive scale.

In commemoration of the services to astronomy rendered by the French observers of the transit of Venus in 1874, the French Government have placed in the National Library of Paris a large monumental vase, designed and manufactured at Sèvres, bearing the following inscription: "La République Française à MM. Janssen, Bouquet de la Grye, André, Fleuriel, Hérault, Mouchez: Passage de Venus sur le Soleil en MDCCCLXXIV. Hommage du Gouvernement Français au Science." This vase, about 2 m. high by 1 m. broad, at present standing at the entrance of the Reading Room of the Library, will remain there for public inspection for some time, after which it will be removed to the Gallerie Mazarine, which contains a collection of rare manuscripts and other treasures.

A number of scientific men in Paris having founded a club called "La Science," for the purpose of dining together at stated times, recently entertained M. Chevreul at a banquet. The toast of the occasion was proposed by M. Jamin, the new Perpetual Secretary of the Academy of Sciences. M. Pasteur has been nominated Chairman of the next banquet. A similar club was instituted six years ago under the name of "Banquet de la Presse scientifique."

In his discourse on re-election to the Presidency of the Biological Society of Paris, M. Paul Bert stated that he had intended endeavouring to summarise the work of the Society during the preceding five years that he had held the office. But he found the task so difficult on account of the mass of facts presented by the publications of the Society, and the brevity of the papers, that he decided to abandon the idea. He promised, however, in future, at the commencement of the annual sessions, to sum up rapidly the progress realised during the preceding one. The scientific world will doubtless look forward with interest to the annual statements of the advance of biological research thus promised.

The Museum of the International Association at Brussels has just received a large collection of birds of all kinds, sent from Karema by Lieut. Storms; and also a collection made by Mr. Stanley during his last visit to the Upper Congo, consisting of utensils, furniture, musical instruments, arms, &c.

The laying of the foundation-stone of the new Sorbonne buildings will take place in a few days, the houses which covered the site intended for the new edifice having been all pulled down and the ground around the old Sorbonne to the extent of several acres having been levelled. The new buildings are to be pushed on rapidly, and the plans connected with the undertaking contemplate giving quite a new aspect to this part of the Quartier Latin. The enlargement of the Sorbonne was projected by Napoleon III. some years before 1870, and he had so far made a beginning with the work as to pull down several houses, and with all due state lay the first stone towards the additional structures in contemplation. The "first of the first stones" so laid down has been removed, though there is a rumour current that after search this first stone has not been found, and people are at a loss to know what has become of it. At all events the laying of the second of the first stones of the new Sorbonne will shortly be celebrated with becoming ceremony.

The International Society of Electricians has decided to hold an exhibition in January next, on the occasion of the first general meeting. The exhibition, which will last several days, is to be held in the rooms of the Observatory of Paris, which have been lent for the purpose by the director.

According to the *Oxford Magazine* there have been several interesting additions lately to the collection of casts in the University Museum. By the side of the skull of a Dinotherium now stands the skull of a Mastodon. Casts of the complete skeleton of Halitherium, the curious Miocene Sirenian which possesses distinct though small hind limbs, and of the hind and fore feet of the gigantic *Iguanodon Bernissartensis*, the original of which is one of the chief features of the Natural History Museum at Brussels, have also been added.

An exhibition of the arts, industries, and natural productions of the Malay Archipelago was opened under the patronage of the Government of the Dutch East Indies at Batavia last month. The productions of Penang, Singapore, North Borneo, and Sarawak are largely represented.

Prof. Mell, director of the Alabama Weather Service, announces that through the liberality of the chief signal officer and of several railways; daily weather signals predicting changes of weather and temperature, will in future be displayed at upwards of 100 telegraph stations in the State of Alabama. The predictions will be received by the director at an early hour every morning from the Signal Office at Washington, and then promptly distributed along the railways. On paying about six dollars, the cost of the signal flags, any town or telegraph station will receive free telegraphic warning of the daily weather changes. Only about five minutes are required to set the flags. A similar extension of weather signals has been for some time in operation in Ohio and in a portion of Pennsylvania.

THE last Consular Report from China, published as a Parliamentary Blue-Book (China 6A Trade Reports), contains the appendixes to the annual report of the English Consul at Ichang. They deal with the animal, fossil, mineral, and vegetable products of the Ichang district. A considerable part of the *flora* appears to be employed only for medicinal purposes. The extracts from Mr. Gardner's diary of his travels through the province are sometimes extremely interesting; his account of a visit to the fossil quarries is especially so. Three kinds of fossils found in the district are staples of trade, the pagoda stones *Orthoceras*), kosmos stones (*Ammonites*), and the "stone swallows." The first is found in the slate, and is cut, and either framed as a picture, or made into ornamental furniture. The *Ammonites* receive the name of "kosmos stones" from their resemblance when polished to the Chinese symbol for kosmos. The so-called stone swallows are ground down, and, like much else in that region, used as medicine. These are fossil bivalves, and the name is given to them because the natives believe that they fly about underground in the same way that the swallow flies in the air. The fossil cutters appear to be a separate guild, and mostly converts to Christianity. The tools are merely a saw and a chisel. They prod about the slate until they find an *Orthoceras*, which they think will be perfect; they then cut out a slab, which they saw into two or three thin planks, so that the fossil looks like a white picture of a pagoda on a black ground. These various fossils are close together in a region at least thirty miles long, and Mr. Gardner thinks that there is hardly a cubic foot of the limey slate which does not contain a fossil or the fragment of one.

THE most recent link in the long chain of telegraph lines which is spreading with such rapidity over China is the land line from Shanghai to Canton. A line from Pekin to Tientsin was opened a few months ago, and the capital of China was connected directly with London. Now the capital of Southern China is joined with the metropolis in the north; and as Canton was put in communication by telegraph with the frontier of Tonquin at the outbreak of the present political troubles in the latter district, the telegraph now stretches in an unbroken line from Pekin in the north to the most southern boundary of the Chinese Empire, and a message either from London or Pekin might reach the head-quarters of the Chinese forces on the Tonquin frontier in a few hours. Four years ago the only telegraph line in China was one about six miles in length, stretching from Shanghai to the sea, and erected to inform the mercantile community of the arrival of vessels off the mouth of the river. The next important line constructed by the Chinese Government will probably be one uniting Pekin with the great northern lines across Siberia at Kiachta. This will have to cross the whole of Mongolia, and will give the capital of China a third alternative telegraph route to Europe, a matter to which some political importance is believed to be attached in China. As already pointed out in NATURE, this extraordinary development is due solely to political considerations.

A COMMISSION appointed by the French Government to consider the best method of developing the mineral wealth of Annam and Tonquin has just issued its report. It lays down a programme for a mining mission, which it has been decided to send out there, and suggests the appointment of two separate missions. The duty of the first of these would be to ascertain whether the metalliferous deposits stated by Annamite documents to exist in two north-western provinces of Tonquin do actually exist there, and how far it would be possible to work them profitably. The second should investigate the copper deposits of the delta, and subsequently extend its labours into Annam. A draft mining law for these regions has also been proposed. Its special provisions are those relating to the mutual rights of the owners of the soil and those who have been granted concessions to work the mines; to administrative intervention (which it is recommended should be as rare as possible) with private mine owners. The broad policy laid down by the Commission is very liberal, not only to the natives, whose rights or alleged rights are to be scrupulously respected, but also to other nations, whose subjects are, for mining purposes, to be placed on the same footing as Frenchmen. Work, it is said, can take place at once on the coal-measures known to exist on the coast of Tonquin, as well as in the adjacent islands.

THE several correspondents of *La Lumière Electrique*, who have been sent to report on the progress of electricity in America, have returned to Paris, and are preparing their reports, which will be published next year.

THE site for the Centennial French Exhibition has been selected. It is to be held on the Champ de Mars, which belongs to the War Office, but will be given up to the city of Paris. A part of the Champ de Mars will be sold for building purposes. The Central Palace of the Exhibition will be made permanent and used for yearly exhibitions like those held in London at South Kensington.

PROF. T. C. MENDENHALL, *Science* states, has been appointed Chief Electrician of the U.S. Signal Bureau.

THE additions to the Zoological Society's Gardens during the past week include a Silvery Gibbon (*Hylobates leuciscus* ♀) from Java, presented by Mr. C. H. A. Hervey; a Bonnet Monkey (*Macacus sinicus*) from India, presented by Mrs. J. N. L. Boljahn; a Common Roe (*Capreolus capræa*), British, presented by Mr. C. Hambro; a Common Rhea (*Rhea americana* ♂) from South America, presented by Lady Brassey, F.Z.S.; a Tawny Owl (*Syrnium aluco*), European, presented by Mr. W. P. Clark; a Greater Sulphur-crested Cockatoo (*Cacatua galerita*) from Australia, presented by Mr. R. O. S. Ogilby; a Greater Black-backed Gull (*Larus marinus*), British, presented by Mr. T. E. Gunn; a Herring Gull (*Larus argentatus*), a Common Gull (*Larus canus*), three Greater Black-backed Gulls (*Larus marinus*), three Black-headed Gulls (*Larus ridibundus*), British, presented by Mr. W. H. Fielden, C.M.Z.S.; a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, a Brush-tailed Kangaroo (*Petrogale penicillata* ♀) from New South Wales, a Hairy-fronted Muntjac (*Cervulus crinifrons* ♂), two Michie's Tufted Deer (*Elaphodus michianus* ♂ ♀) from China, a Tawny Owl (*Syrnium aluco*), European, a Hobby (*Falco subbuteo*), British, deposited; two Common Guillemots (*Lomvia troile*), a Razorbill (*Alca torda*), British, purchased.

OUR ASTRONOMICAL COLUMN

OCCULTATIONS OF ALDEBARAN.—The next series of occultations of Aldebaran visible at Greenwich commences on February 22, 1885, and terminates on October 6, 1887. The dates and mean times of immersion and emersion are as follow:—

			Immersion h. m.	Emersion h. m.
1885	February	22	5 17	5 50
	March	21	11 43	below the horizon
	November	22	9 48	10 57
1886	January	16	7 48	8 49
	April	8	5 8	5 54
	November	12	18 27	19 16
1887	January	6	12 17	13 15
	March	2	5 47	6 4
	October	6	15 20	16 2

There are therefore eight occultations in this series in which both immersion and emersion are visible, and one in which only the immersion occurs while the star is above the horizon at Greenwich. In the last series, which commenced September 28, 1866, and ended on August 2, 1869, ten occultations were wholly visible.